more from the Cassiopeia Project

Two beams have been injected and successfully completed a full loop in both directions

27km,2000 Super Magnet Conductors at 1.9 kelvin (-271.25ºC) (-456.25ºF)

This Large Hadron Collider machine allows humans to have a much greater understanding of time, space and how matter can create itself from NOTHING!..

Science main goal is to find a particle called Higgs which will explain matter itself, some people see it as the particle of God.

It is, in a word, but the logical correlative of 'content' in an Experience of which the peculiarity is that fact comes to light in it, that awareness of content takes place.

~ William James

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Ants

Nature gives us a lot of examples of complex behavior emerging from the interaction of many individuals. The members of an ant colony are capable of a wide variety of complex behaviors... finding and transporting food... constructing elaborate underground complexes of tunnels and chambers... defending their territory from invaders. Such activity would seem to involve a great deal of planning, memory, and coordination. But there is no “head ant” who draws up a blueprint for the colony and gives directions to the worker ants. “Turn that tunnel to the left! Bring that piece of sand over here!” Instead, each ant follows a very simple set of rules, based on cues from its environment and from the activity of ants nearby.

For example... how do ants know to walk in a single file to pick up food, and then return in single file to the nest? They don’t. They know three simple rules. First, if you come upon something that smells like food - pick it up! Second, when you pick up a piece of food, release a chemical signal... a pheromone. Third, if you come across a pheromone trail left by another ant... follow it.

Let’s see what happens when a group of ants follow these three simple rules.

The first ant wanders about its environment and picks up a piece of food. She releases a chemical signal and begins to leave a trail. As the ant continues to wander, other ants stumble upon her trail. They follow this trail, and are led to the food. Some of them may follow the trail the wrong way, but that’s ok. Once the first ant reaches the nest, she will drop off the morsel of food. And when she exits the nest again, she will come upon her own pheromone trail and follow it. The ant doesn't remember where the food is. She doesn’t know that she is following her own trail. She’s just following rule number three - always follow the trail.

Meanwhile, more and more ants have come upon the original trail and followed it to the food. As they follow the first ant’s path back, they strengthen and refine the chemical trail. Soon the ants will appear to march in single file to the food and back. There is no plan. No memory of where the food is. No need for a leader to point the way. Three simple rules and a few environmental clues are all that is needed to orchestrate this remarkably efficient process.

AvatarLude3

KEVIN: I certainly recognize that the ants and the food is a great example of complex behavior arising from a few simple rules.

But don’t we need to ask how those rules got so ingrained in the ants that they follow them?

DIANA: That’s a good question, but one that I believe most good biologists could answer with ease. Why don’t we meet later Kevin and I will show you how good a biologist “I” can be.

KEVIN: It’s a date – but only if you’ll stop being a redhead...it makes me nervous.

DIANA: I will pick you up at 7:03 if that’s OK?

CHAUCER: 7:03??? ...Never mind ...can we get back to our story please?

...Jeeves...this next section should be of particular interest to you. If nothing else it emphasizes how unique you and a few of your fellows are in comparison to the general state of cybernetics.

Robots

From dog stars to dog impos-STARS -- we are now embarking on the age of robots.

The enormous complexity of living things has been brought sharply into focus by our efforts to create machines that mimic organic, living creatures.

We now have robots that help in many fields...Bomb disposal, fire and rescue operations , hospital care, military drones and tanks. Our desire to build robots seems boundless.

Indeed, robot building competitions are held annually at many high schools and colleges across the country.

We now have robots that can fly planes -- Can you guess which plane is being piloted by a robot?

On the other hand the robots that explore other planets can certainly perform feats no human should attempt.

From laser eye surgery to automobile construction, we have been quite successful in building robots that can perform remarkably well in situations that can be defined by simple rules and repetitious tasks.

Similar to the way ants can perform tasks following simple rules, pool robots clean by moving around in random patterns that eventually cover the entire pool bottom. The tail sweeps back and forth to raise bottom debris while a water vacuum sucks the dirt into a container bag or net. And occasionally it backs up to avoid getting caught in corners.

Vacuum Cleaner robots perform their duties with very similar algorithms.

The efforts to equip robots with cameras for eyes and other parts that mimic living creatures have met with considerably less success. Only very recently has there been real progress in creating androids – robots shaped like humans that can exhibit a wide range of our muscular and motor functionality.

But we are still at the starting line when it comes to creating machines that can mimic human thought.

Human Brains

It is easy to imagine an ant or a robot as a mindless agent following simple rules that produce the illusion of complexity. But what of the human mind? Surely everything that humans do from designing skyscrapers to composing symphonies... is not the product of a few simple behaviors. And yet it might be...because everything that humans do (or think or feel) is the result of these basic units of brain structure - the neurons.

The human brain contains more than a hundred billion neurons. Just like a single ant could never build an anthill, a single neuron can't think or feel or remember. A neuron's power is a result of its connections to other neurons. Each neuron is connected to as many as a thousand of its neighbors. These trillions of connections provide the playing field upon which the complex activity of the brain takes place. Each neuron can turn its neighbors on or off depending on the signals it sends, and the resulting stable patterns of neuron firing represent memories...and images... and thoughts.

We don't yet understand the relationship between neural activity and mental experience. We don’t know what the precise pattern of a memory or an image or a thought looks like. We don’t yet know how to read the cerebral "code" of the neurons. But by looking at the behavior of other complex systems - from anthills to computer simulations - we may yet learn some techniques that allow us to work our way UP from the activity of a few neurons to see the structure that emerges from the whole.

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480 Climbing the Ladder of Structure

It is possible to view the entire history of the universe as a story of complexity emerging again and again from simple systems under the influence of simple rules. The laws of physics bind together the most fundamental constituents of matter - electrons and quarks - into stable structures called atoms. Atoms themselves are subject to a new set of rules... pushing and pulling one another, and combining into new forms – molecules – governed by the laws of chemistry.

Simple molecules of water and carbon dioxide, consisting of only a few atoms, can combine and interact in ever more complicated ways... building more and more complex structures... clumps and chains and rings. The rules of chemistry are universal. The same kinds of amino acids that we find in our own bodies can also be found in the cold depths of space.

At some point, very large and complex molecules become capable of something new. DNA molecules make copies of themselves. The chemical metabolism inside of a cell produces and stores energy... energy that can be used for motion... and reproduction. The raw material of chemistry has given rise to a new kind of complex behavior - one that we call... life.

Large multi-cellular organisms involve a whole new class of structures... cells produce tissues and organs and organisms of greater and greater complexity.

Driven by natural selection, yet another set of laws, life has been able to diversify and take on more and more complex forms. From the first organism that could sense its environment and react to light, neurons led to nerves and nerves led to brains.

At this level of complexity, an organism can gather information with its senses and then use that information to influence the future – what a concept!

The human brain is perhaps the most complex structure in the universe, and in its complexity comes the most mysterious phenomenon that science has attempted to understand - consciousness.

At this level of complexity, not only does an organism gather information and use it to influence the future, **but it can take notice of itself doing this.**

It can influence the future with an intention to change itself. It can also cause changes to its species through direct modification of its own blueprint – genetic manipulation, and DIRECTED evolution – WOW!

So, from three fundamental particles, we have now constructed an organism that is alive, conscious, self-aware, and has the ability to understand itself and the universe that it occupies -- how wonderfully complex.

490 AvatarEnd

DIANA:

Wow! That was simply amazing!

KEVIN:

...What WERE you doing in my truck that night?

KEVIN: “You are woman, hear you roar!”

CHAUCER: OK, Jeeves, you can “deep seven” the rest of it please.

JEEVES(Voice fading as the whole scene fades to black):

As...youuuuuu.....wishhhhhhh.....